CLAIMS

1. A combination comprising:

a read head including:

a read sensor;

first and second lead layers connected to the read sensor;

nonmagnetic insulative first and second read gap layers with the read sensor and the first and second lead layers being located between the first and second read gap layers;

ferromagnetic first and second shield layers with the first and second read gap layers being located between the first and second shield layers;

the first read gap layer having a resistance R_{G1} between the first shield layer and one of the first and second lead layers and the second read gap having a resistance R_{G2} between the second shield layer and said one of the first and second lead layers;

a connection via a plurality of resistors between a first node and each of the first and second shield layers wherein the plurality of resistors includes at least first and second resistors R_{S1} and R_{S2} and the first node is connected to said one of the first and second lead layers;

a second node located between the first and second resistors R_{S1} and R_{S2}; and

an operational amplifier having first and second inputs connected to the first and second nodes respectively so as to be across the first resistor R_{S1} and an output connected to the first node for maintaining the first and second nodes at a common voltage potential.

2. A combination as claimed in claim 1 wherein the sensor and the first and second resistances R_{S1} and R_{S2} are coplanar.

3. A combination as claimed in claim 1 including:

a test instrument for enabling a determination of resistance having a first side connected to the first node and a second side connected to at least one of the first and second shield layers.

4. A combination as claimed in claim 3 including:

the first and second shield layers being shorted together; and

the second side of the test instrument being connected to each of the first and second shield layers.

5. A combination as claimed in claim 4 wherein the sensor and the first and second resistances R_{S1} and R_{S2} are coplanar.

6. A combination as claimed in claim 5 further comprising:

a write head which includes:

a write head including:

ferromagnetic first and second pole piece layers that have a yoke portion located between a pole tip portion and a back gap portion;

a nonmagnetic write gap layer located between the pole tip portions of the first and second pole piece layers;

an insulation stack with at least one coil layer embedded therein located between the yoke portions of the first and second pole piece layers; and

the first and second pole piece layers being connected at their back gap portions.

7. A combination as claimed in claim 6 wherein the second shield layer and the first pole piece layer are a common layer.

8. A combination as claimed in claim 6 wherein the second shield layer and the first pole piece layer are separate layers; and

a nonmagnetic insulative isolation layer located between the second shield layer and the first pole piece layer.

9. A combination as claimed in claim 1 including:

the second resistor R_{S2} being connected between the second node and the second shield layer; and

a third resistor R_{S3} being connected between the second node and the first shield layer.

10. A combination as claimed in claim 9 wherein the sensor and the first, second and third resistances R_{S1}, R_{S2} and R_{S3} are coplanar.

11. A combination as claimed in claim 9 including:

a test instrument for enabling a determination of resistance having a first side connected to the first node and a second side connected to the first shield layer.

12. A combination as claimed in claim 11 wherein the sensor and the first, second and third resistances R_{S1}, R_{S2} and R_{S3} are coplanar.

13. A combination as claimed in claim 12 further comprising:

a write head which includes:

a write head including:

ferromagnetic first and second pole piece layers that have a yoke portion located between a pole tip portion and a back gap portion;

a nonmagnetic write gap layer located between the pole tip portions of the first and second pole piece layers;

an insulation stack with at least one coil layer embedded therein located between the yoke portions of the first and second pole piece layers; and

the first and second pole piece layers being connected at their back gap portions.

14. A combination as claimed in claim 9 including:

a test instrument for enabling a determination of resistance having a first side connected to the first node and a second side connected to the second shield layer.

15. A combination as claimed in claim 14 wherein the sensor and the first, second and third resistances R_{S1}, R_{S2} and R_{S3} are coplanar.

16. A combination as claimed in claim 15 further comprising:

a write head which includes:

a write head including:

ferromagnetic first and second pole piece layers that have a yoke portion located between a pole tip portion and a back gap portion;

a nonmagnetic write gap layer located between the pole tip portions of the first and second pole piece layers;

an insulation stack with at least one coil layer embedded therein located between the yoke portions of the first and second pole piece layers; and

the first and second pole piece layers being connected at their back gap portions.

17. A method of making comprising the steps of:

making a read head including the steps of:

forming a read sensor;

forming first and second lead layers with the first and second lead layers connected to the read sensor;

forming nonmagnetic insulative first and second read gap layers with the read sensor and the first and second lead layers located between the first and second read gap layers;

forming ferromagnetic first and second shield layers with the first and second read gap layers located between the first and second shield layers and the first read gap layer having a resistance R_{G1} between the first shield layer and one of the first and second lead layers and the second read gap having a resistance R_{G2} between the second shield layer and said one of the first and second lead layers;

forming a connection via a plurality of resistors between a first node and each of the first and second shield layers wherein the plurality of resistors includes at least first and second resistors R_{G1} and R_{G2}, the first node is connected to said one of the first and second lead layers and a second node is located between the first and second resistors R_{S1} and R_{S2}; and

connecting first and second inputs of an operational amplifier to the first and second nodes respectively so as to be across the first resistor R_{S1} and connecting an output of the operational amplifier to the first node for maintaining the first and second nodes at a common voltage potential.

18. A method of making as claimed in claim 17 including making the sensor and the first and second resistances R_{S1} and R_{S2} coplanar.

19. A method of making as claimed in claim 18 wherein the step of making the sensor and the first and second resistances R_{S1} and R_{S2} coplanar includes the steps of:

simultaneouly depositing a single layer of material for the sensor and the first and second resistances R_{S1} and R_{S2}; and

simultaneously patterning said single layer of material to form the sensor and the first and second resistances R_{S1} and R_{S2}.

20. A method of making as claimed in claim 17 including:

connecting a first side of a test instrument for enabling a determination of resistance to the first node and connecting a second side of the test instrument to at least one of the first and second shield layers.

21. A method of making as claimed in claim 20 including:

shorting the first and second shield layers together; and

connecting the second side of the test instrument to each of the first and second shield layers.

22. A method of making as claimed in claim 21 including making the sensor and the first and second resistances R_{S1} and R_{S2} coplanar.

23. A method of making as claimed in claim 22 wherein the step of making the sensor and the first and second resistances R_{S1} and R_{S2} coplanar includes the steps of:

simultaneouly depositing a single layer of material for the sensor and the first and second resistances R_{S1} and R_{S2}; and

simultaneously patterning said single layer of material to form the sensor and the first and second resistances R_{S1} and R_{S2}.

24. A method of making as claimed in claim 23 further comprising the steps of:

making a write head including the steps of:

forming ferromagnetic first and second pole piece layers with a yoke portion between a pole tip portion and a back gap portion;

forming a nonmagnetic write gap layer between the pole tip portions of the first and second pole piece layers;

forming an insulation stack with at least one coil layer embedded therein located between the yoke portions of the first and second pole piece layers; and

connecting the first and second pole piece layers at their back gap portions.

25. A method of making as claimed in claim 24 wherein the second shield layer and the first pole piece layer are formed as a common layer.

26. A method of making as claimed in claim 24 wherein the second shield layer and the first pole piece layer are formed as separate layers; and

forming a nonmagnetic insulative isolation layer between the second shield layer and the first pole piece layer.

27. A method of making as claimed in claim 17 including:

the second resistor R_{S2} further being connected between the second node and the second shield layer; and

connecting a third resistor R_{S3} between the second node and the first shield layer.

28. A method of making as claimed in claim 27 including making the sensor and the first, second and third resistances R_{S1}, R_{S2} and R_{S3} coplanar.

29. A method of making as claimed in claim 28 wherein the step of making the sensor and the first, second and third resistances R_{S1}, R_{S2} and R_{S3} includes the steps of:

simultaneouly depositing a single layer of material for the sensor and the first, second and third resistances R_{S1}, R_{S2} and R_{S3}; and

simultaneously patterning said single layer of material to form the sensor and the first, second and third resistances R_{S1}, R_{S2} and R_{S3}.

30. A method of making as claimed in claim 27 including:

connecting a first side of a test instrument for enabling a determination of resistance to the first node and connecting a second side of the test instrument to the first shield layer.

31. A method of making as claimed in claim 30 including making the sensor and the first, second and third resistances R_{S1}, R_{S2} and R_{S3} coplanar.

32. A method of making as claimed in claim 31 wherein the step of making the sensor and the first, second and third resistances R_{S1}, R_{S2} and R_{S3} includes the steps of:

simultaneouly depositing a single layer of material for the sensor and the first, second and third resistances R_{S1}, R_{S2} and R_{S3}; and

simultaneously patterning said single layer of material to form the sensor and the first, second and third resistances R_{S1}, R_{S2} and R_{S3}.

33. A method of making as claimed in claim 32 wherein the second shield layer and the first pole piece layer are formed as a common layer.

34. A method of making as claimed in claim 32 wherein the second shield layer and the first pole piece layer are formed as separate layers; and

forming a nonmagnetic insulative isolation layer between the second shield layer and the first pole piece layer.

35. A method of making as claimed in claim 27 including:

connecting a first side of a test instrument for enabling a determination of resistance to the first node and connecting a second side of the test instrument to the second shield layer.

36. A method of making as claimed in claim 35 including making the sensor and the first, second and third resistances R_{S1}, R_{S2} and R_{S3} coplanar.

37. A method of making as claimed in claim 36 wherein the step of making the sensor and the first, second and third resistances R_{S1}, R_{S2} and R_{S3} includes the steps of:

simultaneouly depositing a single layer of material for the sensor and the first, second and third resistances R_{S1}, R_{S2} and R_{S3}; and

simultaneously patterning said single layer of material to form the sensor and the first, second and third resistances R_{S1}, R_{S2} and R_{S3}.

38. A method of as claimed in claim 37 wherein the second shield layer and the first pole piece layer are formed as a common layer.

39. A method of making as claimed in claim 37 wherein the second shield layer and the first pole piece layer are formed as separate layers; and

forming a nonmagnetic insulative isolation layer between the second shield layer and the first pole piece layer.